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The Balance of Forces of Opposing Sides in Aviation
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A knowledge of the actual balance of aviation forces of the combatant sides in the initial offensive operation of a front allows the command and staffs of the front and air army to more fully understand the significance and scope of the combat they have to conduct against enemy aviation in the zone of the front, and on this basis, taking the other elements of the situation into account, to determine the most efficient forms of combat employment and methods of operation of the various forces.

In addition, the results of assessing the balance of aviation forces make it possible to indirectly judge the validity of the proposed echeloning of aviation forces, as well as the most desirable allocation of tasks between the aviation and rocket troops of the front.

However, there currently is no practicably acceptable method of establishing a commensurate balance between the aviation of the sides which takes the quantity and quality of forces into account, nor has there been developed an approach to producing a graphically logical model of the process in which this balance changes in relation to factors of a qualitative order.

In order to be convinced of this, it is enough to briefly touch upon the essence of the methods of assessing the balance of forces of the sides in aviation which were previously employed and now are used in operational training.

The most widespread method consists of comparing only the numerical strength of aircraft by types of aviation. Despite the imperfection of such a method (taking only the quantitative aspect into account), it nevertheless provided acceptable accuracy in determining the balance of forces in the operations of past wars. This was explained by the fact that essentially only aviation was used to deliver strikes against targets of approximately equal importance in the tactical and operational depth. Since the types of aircraft in service on both sides had almost the same 50X1-HUM tactical flight specifications, their means of destruction also were identical. In other words, the operational-tactical conditions under which

the adversaries employed aviation were quite similar. With the emergence of nuclear weapons and other means of mass destruction in the aviation armament, and also because of a marked difference in certain aircraft tactical flight specifications (for example flight range and duration, etc.), it became necessary to take into full consideration the qualitative as well as the quantitative aspect of the balance of forces. In this connection the method of assessing the balance of forces by comparing only the numerical strength of aircraft became outdated.

It came to be replaced by another method: the qualitative aspect of the balance of forces began to be assessed by analyzing the tactical-technical specifications of the main types of weapons and combat equipment, comparing the qualitative data by types of nuclear warheads and their yield, and also by correlating the basing conditions. Of course this method of considering a large number of unrelated quantities did not provide a specific enough representation of the actual balance of aviation forces of the opposing sides.

A further step forward was the method of determining the balance of aviation forces based on a correlation of the possible mutual losses or a comparison of generalized criteria for the aviation combat capabilities of the sides. The imperfection of this method is primarily that, of a great diversity of factors determining the qualitative aspect of the balance of aviation forces of the sides, only the number of targets hit and the capabilities for negotiating enemy air defense are used in the calculation. It is obvious that these two criteria, although they are very important, do not in themselves allow establishing the actual level of aviation combat potential of the sides. Moreover, the accuracy of this method is reduced also by the fact that the assessment of the balance of forces is given without consideration for the specific features of the combat employment of any one type of aviation.

Finally, an assessment of the balance of forces based on a correlation of the aviation combat capabilities of the sides and possible losses is not completely balanced in respect to methodology, since accurate determination of these capabilities requires knowledge of the optimum variants of using the aviation of the sides. If we consider that, when assessing a situation and planning even the initial offensive operation of a front, the appropriate staffs hardly will have available exhaustive information on the enemy, it becomes obvious that this method allows only roughly determining the balance of forces of the sides in aviation. 50X1-HUM

And finally, this method certainly does not take into account such factors, for example, as the existence of non-nuclear and nuclear periods of actions; possible changes in the relative proportion and role of aviation during an operation; the unequal position of the aviation of the sides in the employment of nuclear weapons; the considerable influence of the preemptive employment of nuclear warheads and their effectiveness on the success of combat actions; the different ways in which the aviation groupings of the sides are echeloned and reinforced, etc.

To eliminate the shortcomings noted and be able to take a number of factors into account in their quantitative and qualitative sense, requires developing a diagram corresponding to the assessment of the balance of aviation forces of the sides in the initial offensive operation of a front.

We will examine in detail the construction of a graphically logical model which, in our opinion, can form the basis of a new, more improved method of assessing the balance of forces in aviation.

Obviously it must be based on a correlation of the combat strengths of the types of aviation being compared. In so doing both the numerical strength of the latter, and the most important factors of a qualitative order, expressed by using certain coefficients or ratios, are taken into account.

In this connection, first of all we will note that the balance of aviation forces should mean not the degree of commensurability of their combat capabilities, but the results of comparing the listed combat strengths with the quantitative indices of the combat potential of the types of aviation being correlated, i.e., taking their numerical strength and the quality and scope of their assigned tasks into account.

The objective of calculation in assessing the balance of aviation forces of the sides in the initial front offensive operation is to determine the degree of superiority of their combat strengths, taken by types of aviation, with consideration for the qualitative aspect at the same moment in time.

It is desirable to establish a standardized balance of forces in aviation with consideration for the quantitative and qualitative aspects (the latter can change the balance by either increasing or decreasing it) on the basis of an analysis of a large number of factors, comprising five groups: combat strength, striking capacity, action time, effectiveness in negotiating air defense, and survivability.

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Combat strength -- the number of aircraft and crews.

Striking capacity -- this is the capability of the type of aviation being compared, with a bombing/firing range detail of aircraft (without taking account of air defense countermeasures), operating in the strike variant, to achieve a set degree of destruction of all the standard targets allocated to it (the type of aviation), taking into account the employment of nuclear warheads, and chemical and conventional means of destruction.

The major factors determining the striking capacity of any one type of aviation are: the number of crews and aircraft capable of operating in the strike variant; the strength of the nuclear echelon and reserve; the number of reserve crews; the strength and time available for reinforcement; the level of training of air crews for day and night operations; the scope of the tasks being fulfilled by the types of aviation being compared; the functional nature of the standard targets located within range of the front and army group means, and their vulnerability; the relative proportion of the forces using nuclear warheads, and chemical and conventional means of destruction, out of the types of aviation being compared; the number and mix of nuclear warheads and chemical and conventional units of fire; the composition of the aircraft unit of fire when flying to radius; the range details of aircraft required to destroy standard targets to the same degree; the distance of the rear boundary of the disposition of allocated standard targets; the tactical radius of operation and the aerial refueling capability; the maximum number of sorties flown in 24 hours; the mobility of aviation and support units, and the frequency of rebasing.

In the interests of a more precise quantitative assessment of the numerous factors it is desirable to define the degrees of destruction of standard targets as functions of the time required to reactivate any one target, taking the average rate of advance of the ground forces and the importance of the targets into account.

In this connection it is logical to differentiate three degrees of destruction of standard targets.

Slight destruction -- target immediately stops functioning and the time required to reactivate it is at least five hours.* For this degree of destruction, obviously, strikes have to be delivered against targets situated at a depth of up to 50 to 80 kilometers from the front line.

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* The time in which a repeat massed strike may be delivered by the same forces is taken here.

Medium destruction -- the time required to reactivate the target subjected to the strike is at least 24 hours. Such a degree of destruction must be prescribed for targets located at a depth of up to 50 to 150 kilometers.

Heavy destruction -- the time required to reactivate the target is at least three to five days. This degree of destruction applies to targets situated at a depth of from 150 kilometers to the maximum range of aircraft at low altitude.

Action time -- the capability of the types of aviation being compared to preempt the enemy in delivering strikes against his aviation means of nuclear attack.

Establishing this capability includes a composite assessment of such factors as the time spent setting up the strikes; the time required for aviation units to achieve readiness to deliver massed strikes from main and temporary airfields at the beginning of and during an operation; daily capabilities for employing aircraft from airborne alert status; and, the amount of forces constantly at full combat readiness during a 24-hour period.

Effectiveness in negotiating air defense -- the capability of range details of aircraft to reach standard targets and employ means of destruction against them.

The basic factors determining this capability may include: the types and average density of enemy air defense means; their effectiveness; the extent to which the opposition of the air defense means is reduced as a result of delivery of the initial massed nuclear strike or neutralization of air defense installations by aviation forces and the employment of various tactical procedures by strike aircraft; the extent to which air defense opposition is reduced during an operation; the proportion of forces allocated to neutralize air defense means; the average aircraft flight density in massed strikes; the capability to use the means of destruction from maximally low altitudes; and, the depth of the operations of the types of aviation being compared.

Survivability -- the degree to which the types of aviation being compared retain combat effectiveness under conditions of enemy action against home airfields.

The following important factors should be taken into account in assessing survivability: the means and methods of destruction employed by the enemy to deliver strikes against the airfields of the types of aviation being compared; the ability to move out from under a strike by these means; the availability of alternate airfields; the possibility of utilizing temporary airfields and the preparedness of the air crews to fly from them; the effectiveness of possible operational camouflage measures; the degree of dispersal of aircraft at the airfields; the preparation of temporary airfields with engineer installations; and, the reliability of the control system.

From the foregoing it is not difficult to observe that all these groups of factors, on the basis of which the balance of forces of the sides in aviation is determined, are interrelated despite their diverse nature, interact with each other, and in sum describe the quantitative and qualitative aspects of the types of aviation being compared.

In order to account for a considerable number of factors of a qualitative order, which lack definition because of their great diversity of relationships, additional research is needed in the direction of determining both the specific criteria for each group of factors and the quantitative indices of the basic factors. The diversity of the factors and of their interrelationships makes their situation probable and also questions the need to establish weighted balances for these indices.

The possibility of making an assessment of the balance of forces on any day of a front offensive operation must be provided for here. However, the greatest accuracy must be achieved in conformity with three basic time limits:
-- prior to the operation and while the initial nuclear strike and the immediate task of the front are being carried out;
-- during the operation, prior to and during fulfilment of the subsequent task of the front;
-- during the operation, up to the time the initial front offensive operation is completed.

A calculation in accordance with these indicated limits permits taking more correct account of the volume of tasks being performed, as well as the numerical strength of the aircraft inventory of any one type of aviation, for by these moments in time substantial increases occur in the number of forces as a result of the commitment to action of new air units and large units by the sides, losses, and changes in other elements of the situation.

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To assess the balance of forces in the non-nuclear period of actions requires a specific approach to taking account of a number of factors, to be specific, it does not require including the nuclear warheads and units of fire of the chemical means of destruction in the calculation, but does require excluding the numerical strength of the aircraft of the nuclear echelon from the combat strength, and refining the number of standard targets which under these conditions may be set apart for the types of aviation being compared.

In determining the balance of forces the ratio of the listed numbers of aircraft of the types of aviation being compared may be taken as the main criterion.

The overall sequence of performing the calculation for assessing the balance of the types of aviation being compared, may be as follows. First an assessment is made of the specific criteria of each group of factors for the types of aviation being compared. Then the listed combat strengths of these types of aviation are determined, taking the weighted balances of computed parameters into account. And finally, the ratio of the listed combat strengths is calculated, and an assessment of the balance of forces is produced.

An assessment of the possible balance of forces must include an analysis of the ratio obtained, with consideration for the following levels.

Unfavorable, when the listed number of aircraft of the interested side is less than or equal to 1.3 times the number of forces of the other side. The coefficient 1.3 is taken in this case according to the experience of the Great Patriotic War, in which this balance resulted in a draw. The size of this coefficient may be revised in the course of further study.

Sufficient, when the forces of the interested side are 1.8 to 2.5 times the forces of the other side. The value of this coefficient in the given range characterizes the level of sufficiency of forces to defeat the enemy aviation grouping in the offensive zone of the front troops, according to the data of a great deal of research.

Permissible, when the forces of the interested side are 1.4 to 1.7 times the number of forces of the other side.   50X1-HUM

Supremacy
Superiority of forces, when the forces of the interested side are more than 2.5 times the forces of the other side. Such a balance characterizes

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<u>decisive</u> <u>superiority</u> of forces, which eliminates any chances.

With this kind of approach to developing a graphically logical diagram-model of the process of determining the balance of aviation forces dependent upon the make-up of factors of a qualitative order, there emerges the possibility of judging the reality of the balance of forces with more accurate approximation.

The basic assumptions in this instance are conditioned mainly by failure to allow for the influence on the balance of forces of such vital factors as·the morale of the personnel, the quality of work of the command and staffs, and the presence of several types of aircraft in service with the types of aviation being compared. Moreover, the proposed diagram does not fully embrace specific factors for fighter aviation and reconnaissance aviation (for example, guidance capabilities for fighter aviation, and the effectiveness of conducting aerial reconnaissance by various means for reconnaissance aviation, etc.), but they may easily be defined specifically by analogy with those already indicated.

In conclusion it should be emphasized that an accurate account of all the factors which in the final analysis determine the balance of forces, will require using an electronic computer.

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